

Senegal - Road Construction

Report generated on: March 8, 2018

Visit our data catalog at: <https://data.mcc.gov/evaluations/index.php>

Overview

Identification

COUNTRY

Senegal

EVALUATION TITLE

Road Construction

EVALUATION TYPE

Independent Impact Evaluation

ID NUMBER

DDI-MCC-SEN-IMPAQ-RRP-2014-v01

Version

VERSION DESCRIPTION

Anonymized dataset for public distribution

Overview

ABSTRACT

The road sector plays a critical role because 99% of goods produced in Senegal are transported by roads. Because the elected segments of RN 2 and RN 6 have a commercially and politically central geographical location and because of their poor initial state their rehabilitation should have a detectable positive effect on local populations (column 3, 4 and 6.) Implementers rehabilitate the road segments of RN2 and RN6 under the supervision of MCC and MCA (Activities). The byproduct of the activities performed is the rehabilitated roads: 120 km and 256 km of rehabilitated RN2 and RN6 road segments, respectively (Outputs). Note that unexpected delays in the implementation have occurred because of environment factors, such as extreme weather and civil unrest. These contingencies can prevent the timely rehabilitation of the roads. There may be other factors that affect the road rehabilitation project. For example, there could be cost overruns that reduce the length of roads that end up being rehabilitated (outputs), thus affecting fewer beneficiaries than planned (outcomes).

Some outcomes may be realized immediately upon completion of the project, while others may take longer to materialize. Once the road rehabilitation implementation is complete, it is expected that the time and cost required to travel to a certain destination via the rehabilitated roads will be reduced. Also, the targeted road segments will be improved in quality and are thus likely to be used more frequently. These outcomes are expected to be realized shortly after the completion of the roads (short-term outcomes).

The completion of the road rehabilitation is also expected to unlock economic and social opportunities for households and individuals using the road (medium/long-term outcomes). For example, the project may improve access to markets to buy and sell products. It may also be easier and cheaper to find inputs needed for production activities for both formal enterprises and household informal economic activities. Due to the reduced time and cost of travel on the rehabilitated roads, households may enjoy easier access to basic facilities such as schools and health centers. Furthermore, there may be more employment opportunities due to increased demand in markets accessible via the improved roads. Lastly, the value of land and assets along the rehabilitated roads is expected to rise as demand for the road use rises.

Research Question 1: Did the RRP reduce the travel time and costs to households/enterprises located near the rehabilitated roads?

Research Question 2: Did the RRP lead to increased work opportunities for employment and income among beneficiary households?

Research Question 3: Did the RRP lead to increased access to health and education services?

Research Question 4: Did the project affect business opportunities and enterprise revenues?

Research Question 5: What is the ex-post Economic Rate of Return (ERR) of the RRP?

Research Question 6: How are the benefits of the projects distributed among subgroups of the population such as gender, age and income?

Research Question 7: How do the long-term impacts of the road projects per dollar invested compare to other typical infrastructure investments?

EVALUATION METHODOLOGY

Difference-in-Difference

UNITS OF ANALYSIS

Households and enterprises

KIND OF DATA

Sample survey data [ssd]

TOPICS

Topic	Vocabulary	URI
Transport	MCC Sector	

Coverage

GEOGRAPHIC COVERAGE

Regional Coverage

UNIVERSE

Habitants and Enterprises nearby the Roads.

Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
Impaq International	

FUNDING

Name	Abbreviation	Role
Millennium Challenge Corporation	MCC	

Metadata Production

METADATA PRODUCED BY

Name	Abbreviation	Affiliation	Role
Millennium Challenge Corporation	MCC		Review of Metadata

DATE OF METADATA PRODUCTION

2014-11-26

DDI DOCUMENT VERSION

Version 1.1 (November 2014)

DDI DOCUMENT ID

DDI-MCC-SEN-IMPAQ-RRP-2014-v01

MCC Compact and Program

COMPACT OR THRESHOLD

Senegal Compact Road Rehabilitation Project

PROGRAM

Basic infrastructure facilities are public goods and their inadequacy is a significant cause of failure among poor nations (Warr, 2005). In recent years, roads have been extensively championed as poverty alleviation instruments by donor institutions and are regarded as a key to raising living standards in poor rural areas. By reducing isolation, improved roads reduce vulnerability and dampen income variability (Van de Walle and Cratty, 2002). Despite the recent good economic performance (GDP growth rate of 4% in 2013), Senegal remains a poor country. As of 2011, 46.7% of the population lived below the national poverty line. To address concerns that poor road conditions have hindered economic growth (only 35.5% of the total roads were paved as of 2005), the government of Senegal is implementing a roads rehabilitation project using funds from the Millennium Challenge Corporation (MCC). By rehabilitating selected national roads, MCC will improve access to domestic and international markets. In addition, communities along the rehabilitated roads will have improved access to important services such as schools and hospitals. The Roads Rehabilitation Project (RRP) will implement the following activities: § In the North, rehabilitation activities (strengthening, widening and replacing associated structures) of National Road 2 (RN2) covering around 120 kilometers (km) from Richard Toll to Ndoum (Exhibit 2); and construction of the new Ndoum bridge. In the South, rehabilitation activities (strengthening, widening and replacing associated structures) of National Road 6 (RN6) covering at least 256 km from Ziguinchor to Kounkané; and rehabilitation of the Kolda Bridge. § The RRP also contains environmental and social mitigation measures, which include (i) developing community reforestation plans; (ii) implementing an HIV/AIDS awareness program; (iii) relocating or resettling the families affected by the rehabilitation works; (iv) implementing an environmental awareness program for communities; (v) ensuring environmental monitoring; (vi) carrying out planting alignment; (vii) creating and/or removing weekly markets; and (viii) supporting initiatives related to the development of the woods from deforestation caused by communities.

MCC SECTOR

Transport (Trans)

PROGRAM LOGIC

The long-term goal of the Senegal Compact is to reduce poverty and enhance economic growth. Investments in road infrastructure can help Senegal to achieve this goal. In Exhibit 3, we present a logic model that illustrates potential causal pathways through which road rehabilitation projects may lead to poverty reduction. The model moves from the problem statement, activities and outputs, to short and medium term outcomes and the 10 to 20-year impact of the road rehabilitation and construction projects in the North and the South of the country.

PROGRAM PARTICIPANTS

In northern Senegal, habitants of Saint-Louis. In southern Senegal, habitants of Ziguinchor, Sedhiou and Kolda.

Sampling

Study Population

Habitants and Enterprises nearby the Roads.

Sampling Procedure

We use statistical power analysis to calculate the minimum sample size required to detect an effect of a given size. Identifying an appropriate sample size for our impact evaluation depends on various factors and assumptions, including a desired effect size, target power and significance level. For the desired effect size, we used information on the magnitude of benefits from the Beneficiary Analysis provided by MCC. The power of a statistical test is the probability of detecting a true effect when it truly exists. The significance level is the probability of falsely detecting an effect when it does not exist. We calculate the minimum sample sizes required to detect an effect of a given size for each of the combinations of the most commonly used power and significance levels. Using the present value of benefit stream as a share of annual income of about 10% and the per capita GNI of USD 820 in the ERR spreadsheet from MCC, we estimate that approximately of benefits are expected to be generated from the RRP per household for the first 5 years.

Using the least restrictive criteria for the power and test size (80% power and a 5% significance level), it was determined that we need at least 1,227 households in each of the treatment and comparison groups. Thus, the minimum total household sample size is 4,908 ($=1,227 \times 4$). As mentioned, this is the minimum required sample size for the least restrictive assumption for power and test size. For more robust results, we would need larger sample sizes. However, given the trade-off between the statistical rigor and the budgetary constraints faced by MCA-S, we have selected the smallest sample size consistent with a rigorous impact evaluation.

Regarding the sample size requirement for the enterprise survey, in discussion with MCC and MCA-S, we concluded not to use the power analysis due to lack of information about the number of enterprises along the treatment and comparison roads. Instead, we relied on the input of MCA-S staffers who know about business conditions for enterprises along RN2 and RN6. We then proposed a survey sample of approximately 600 enterprises.

Questionnaires

Overview

Baseline data have been collected using in-person interviews from households and enterprises located along the treatment and comparison areas. The baseline survey collected data on background characteristics and key outcomes of interest (income, use of the roads and various economic activities) for both household and enterprises. The survey instrument to collect household data was structured in several sections that collected the following information:

- § Demographic characteristics of household members
- § Employment and revenues of household members
- § Household food and non-food consumption (whether a household has consumed certain types of food and the frequency of purchase)
- § Salary and non-agricultural income of household members
- § Household assets (e.g., type of home, access to electricity, etc.)
- § Household members' use of the road, frequency of use, time and distance traveled to various destinations such as local market, communal market, school, health infrastructure and workplace
- § Agricultural/Livestock production and commercialization: amount of production realized and sold by crop

A separate questionnaire was developed to gather information on enterprises. This data collection effort is essential to gain a full picture of the impact of the RRP. The survey collected detailed information on the type of enterprise activities, the quantity of goods produced and sold, the costs related to the commercialization of goods and the purchase of raw materials, the size of the enterprises in terms of employees and capital equipment, revenues and use of the road in the same areas in which the heads of households were interviewed. In particular, the survey instrument to collect enterprise data was structured in several sections that collected the following information:

- § Information on the entrepreneur
- § Characteristics of the enterprise: e.g., primary activity, workers employed, mobile equipment and machinery (tractors, etc.)
- § Production and commercialization: e.g., the amount of sales from products and services, destination of products and services, use of the road to deliver the products/services, distance traveled on the road
- § Difficulties encountered in the entrepreneurial activity, including whether the enterprise has difficulties obtaining credit, recruiting personnel and difficulties related to the access of the road.

Data Collection

Data Collection Dates

Start	End	Cycle
2012-05-01	2012-06-30	RN2 treatment and comparison segment
2012-10-01	2012-11-30	RN6 treatment and comparison road segments

Data Collection Notes

§ Data collection in the North (RN2 treatment and comparison segment) took place in May and June 2012.

§ Data collection in the South (RN6 treatment and comparison road segments) took place in October and November 2012.

Questionnaires

Baseline data have been collected using in-person interviews from households and enterprises located along the treatment and comparison areas. The baseline survey collected data on background characteristics and key outcomes of interest (income, use of the roads and various economic activities) for both household and enterprises. The survey instrument to collect household data was structured in several sections that collected the following information:

§ Demographic characteristics of household members

§ Employment and revenues of household members

§ Household food and non-food consumption (whether a household has consumed certain types of food and the frequency of purchase)

§ Salary and non-agricultural income of household members

§ Household assets (e.g., type of home, access to electricity, etc.)

§ Household members' use of the road, frequency of use, time and distance traveled to various destinations such as local market, communal market, school, health infrastructure and workplace

§ Agricultural/Livestock production and commercialization: amount of production realized and sold by crop

A separate questionnaire was developed to gather information on enterprises. This data collection effort is essential to gain a full picture of the impact of the RRP. The survey collected detailed information on the type of enterprise activities, the quantity of goods produced and sold, the costs related to the commercialization of goods and the purchase of raw materials, the size of the enterprises in terms of employees and capital equipment, revenues and use of the road in the same areas in which the heads of households were interviewed. In particular, the survey instrument to collect enterprise data was structured in several sections that collected the following information:

§ Information on the entrepreneur

§ Characteristics of the enterprise: e.g., primary activity, workers employed, mobile equipment and machinery (tractors, etc.)

§ Production and commercialization: e.g., the amount of sales from products and services, destination of products and services, use of the road to deliver the products/services, distance traveled on the road

§ Difficulties encountered in the entrepreneurial activity, including whether the enterprise has difficulties obtaining credit, recruiting personnel and difficulties related to the access of the road.

Data Collectors

Name	Abbreviation	Affiliation
Agence Nationale de la Statistique et de la Démographie	ANSD	

Data Processing

No content available

Data Appraisal

No content available